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Government
Publications



Report of Dover Township
Flood Review Committee
to Hon. James A. C. Auld,
Minister of Natural Resources,
May, 1979

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LETTER OF TRANSMITTAL

Honourable James A.C. Auld
Minister of Natural Resources
6th Floor, Whitney Block
99 Wellesley Street West
Queen's Park
Toronto, Ontario
M7A 1W3

Dear Mr. Auld:

The Dover Township Flood Review Committee is pleased to submit its Report to you. Based on discussions with local residents and agencies the Committee has attempted to document the events and actions associated with the Flood and to answer many of the commonly asked questions. Recommendations are based on these discussions as well as advice received from other knowledgeable individuals.

The majority of the recommendations of the Committee are aimed at either reducing the chances of flooding occurring again in Dover Township or reducing the damages when flooding does occur. The four major classes of recommendations include:

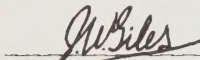
1. Preparation of an Ice Management Plan;
2. Re-evaluation of the adequacy of the partially completed system of dikes;
3. Preparation of co-ordinated flood contingency plans, designed to meet the special needs of Dover Township;
4. Improved awareness by local residents that a flood will occur again and improved communications among local residents and agencies when it does occur.

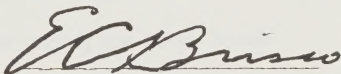
Many of these recommendations are inter-related. Consequently, the Committee would like to stress that such relationships be taken into account when individual recommendations are considered.

The Committee also reviewed the Provincial Policy for Planning for Flood Emergencies and found it to be basically sound. However, the Committee identified a number of specific modifications which should lead to an improved response system. For example, it is recommended that Conservation Authorities actively "promote" flood emergency planning by municipalities, that municipalities more strongly be persuaded to produce such plans and that MNR, the conservation authorities and municipalities initiate communications at the first sign that a flood emergency could arise.


Finally, the Committee would like to thank all those agencies and individuals who assisted the Committee in its assignment.

Particular thanks are expressed to Larry Douglas, Secretary of the Committee, whose services proved invaluable.


J. W. Giles, Chairman


E. C. Brisco, Member


R. Sterling, Member



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1. INTRODUCTION

During the late evening of March 8 and the early morning of March 9, 1979 several dikes breached along the Thames River in Dover Township. Preliminary reports indicated that about 100 homes, 300 farm buildings and over 9000 acres of farm land had been inundated by flood waters, over 100 cattle had drowned and approximately \$2 million property damage had occurred.

In response to the seriousness of the flood damage, the limited warning given to the residents, the absence of a municipal flood contingency plan and a number of conflicting allegations of what should have been done, the Honourable James A.C. Auld, Minister of Natural Resources, established the Dover Township Flood Review Committee. The Committee was directed to document the events and actions that were undertaken before and during the flood, and to advise the Minister on how and whether flood warning and response systems can be improved.

The Committee has discussed the Flood with those agencies having flood emergency responsibilities as well as many of the flood victims. Additional information and advice also was sought from several other individuals. Persons contacted by the Committee are listed in Appendix A.

The findings of the Committee, largely based on these discussions, are outlined in the following four sections. The sections:

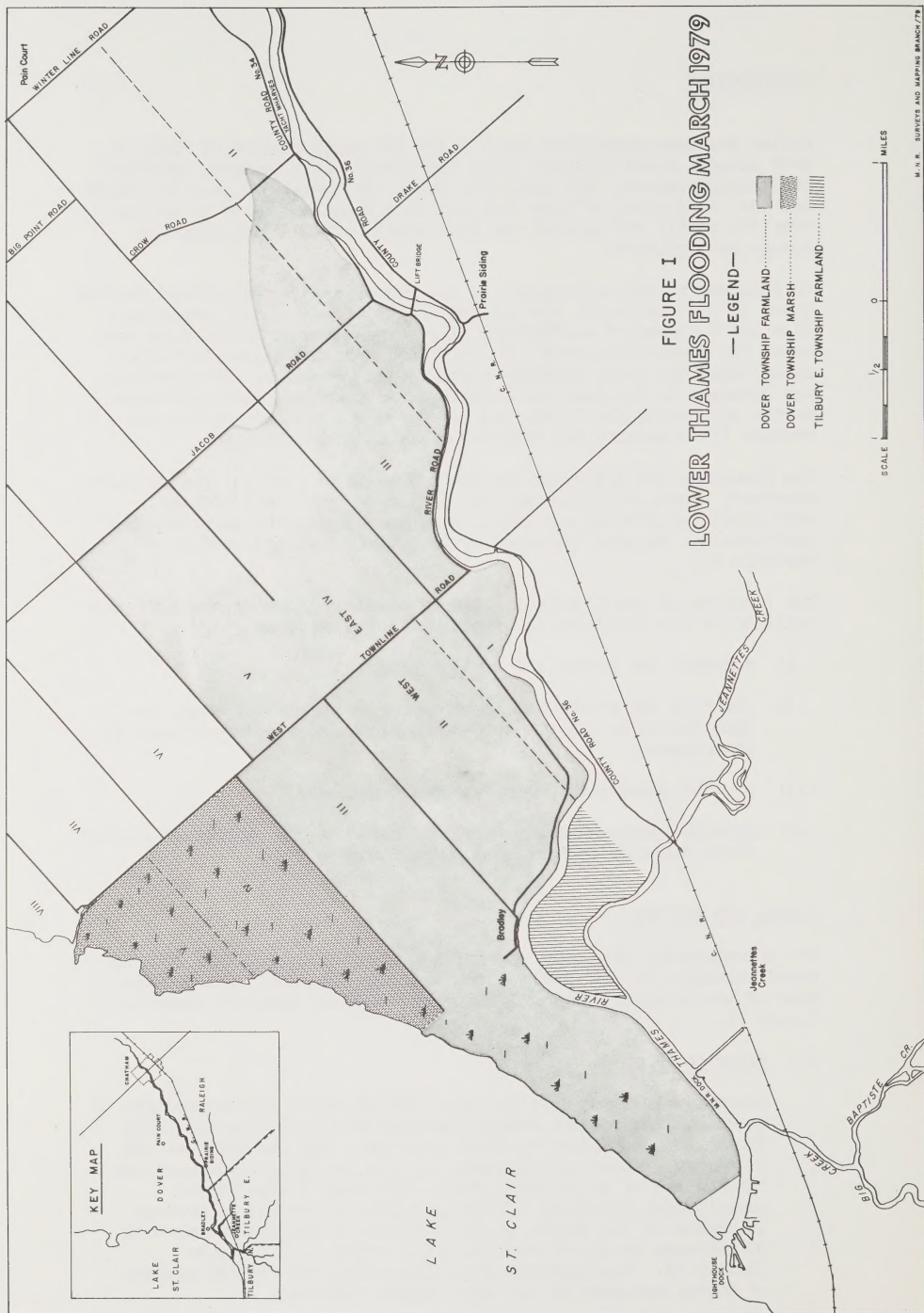
- i) document the events and actions taken;
- ii) describe the provincial flood emergency response system, its application in the Dover Township Flood and recommendations for improvement;
- iii) provide answers to commonly asked questions;
- iv) provide recommendations intended to reduce the chances of another flood disaster occurring in Dover Township.

2. EVENTS AND ACTIONS

The documentation of events and actions associated with the Flood is based primarily on the observations of local residents and agencies. Most of the locations identified in the following text are shown in Figure II.

2.1 Prior to March 3

February, 1979 was a colder than average month in Southwestern Ontario. Environment Canada reported that Lake Erie was fully frozen and, according to local observers, had the thickest ice in memory. Local ice fishermen on Lake St. Clair indicated ice thicknesses of up to three feet. The Lower Thames Valley Conservation Authority (LTVCA) recorded ice having an average thickness of 19½ inches in the vicinity of the Lighthouse Dock on February 14 and an average of 16 inches in Chatham on January 19. The February 16 reading indicated 150-200 percent of normal snowpack in the Upper Thames Watershed.



2.2 March 3 to 5

On March 3, temperatures rose to 9°C to 12°C and rainfall began to occur in the Upper Thames Valley. The Upper Thames Valley Conservation Authority started storing water in Fanshawe Reservoir early on March 4 and the gates were set to maintain outflows at a maximum of about 8,000 cfs.* This regulated outflow rate was maintained until early on March 7 at which time outflows were permitted to return to natural rates. Maximum inflows of about 12,600 cfs were recorded at about 5:00 a.m. on March 5. Pittock Dam and Reservoir started storing water early morning of March 4 and as a result the natural peak flow of 2550 cfs was reduced to 1500 cfs. From mid-day March 5 to mid-day March 8, outflows were maintained at about 800 cfs. The gates on the Wildwood Dam were closed in the late evening of March 4 and remained closed for the next three weeks. Maximum flows from the largely uncontrolled south branch of the Thames reached about 15,000 cfs late on the morning of March 5.

The 10:00 a.m. reading of flows on March 5 at the Byron Gauge, approximately eight miles downstream of Fanshawe Dam, was 26,700 cfs. Based on this flow at Byron which included the combined flows from the south and north branches of the Thames, the LTVCA issued a press release indicating that a peak flood elevation of about 587 feet was expected to arrive in Chatham at about mid-day on March 8. The press release indicated "if ice or debris jamming does not occur, no serious flooding is expected".

2.3 March 6

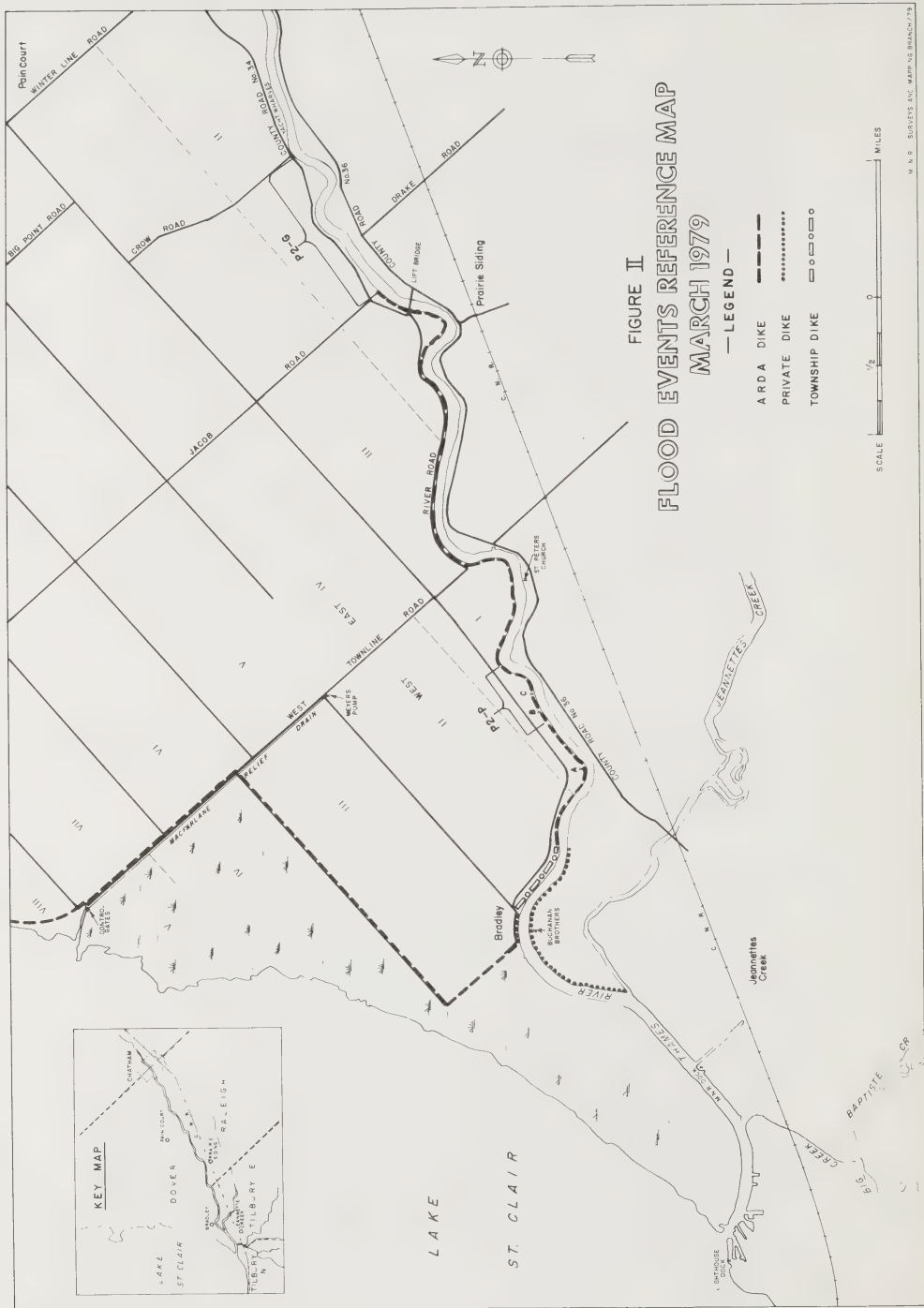
The LTVCA undertook manual gauge readings and observations of ice conditions between Melbourne and Kent Bridge. No unusual conditions were noted. Frequent monitoring of all telemark gauges continued throughout the day. The Thames River was reported by the Authority to be basically sheet ice from the mouth to Chatham.

2.4 March 7

The LTVCA continued to monitor the gauges. At 8:00 p.m., the Thamesville hydrograph indicated peak elevations would be higher than previously expected due to ice conditions. A revised peak flow elevation of 589.5 feet for Chatham was calculated by LTVCA and verified by the Streamflow Forecast Centre in Toronto. The Authority advised the City of Chatham and the local media of revisions by mid-day.

By 1:00 p.m., the Authority noted formation of an ice jam at Kent Bridge. However, it was concluded that no significant restriction of flow was occurring and the jam presented no major problems. At 3:00 p.m., the LTVCA commenced ice observations between Chatham and the mouth of the Thames. Some minor ice jams were noted but conditions were not thought to be unusual. The LTVCA observed no ice jam at the mouth of the Thames and open water was present with the river maintaining a reasonably good flow.

* cubic foot per second



At 4:45 p.m. the Provincial Streamflow Forecast Centre issued a flood advisory.

By late Wednesday afternoon ice downstream at Chatham was starting to break up. A local resident observed ice and water within one foot of the top of the ARDA dike at location A on Figure II at 6:30 p.m. Another resident observed an ice jam half-way between the West Townline and the Prairie Siding Bridge late on Wednesday evening.

2.5 March 8

By early morning water was over the road by the Chatham Yacht Club. A local resident noted overtopping of the ARDA dike just downstream of where the breach was later to occur (location B on Figure II). The LTVCA observed water within six to eight inches of the top of the dike at St. Peter's Church. Water was overtopping the private dikes adjacent to the Bradley Settlement and was pouring through two breaches. Water also was overtopping the dike on the Tilbury East side adjacent to the Buchanan property. The Bradleys, Buchanans and Tilbury East residents all were working to protect their dikes by mid-morning. At 11:00 a.m., the LTVCA noted a good flow in an area at the Ministry of Natural Resources' (MNR) Jeannettes Creek dock, sheet ice downstream and an ice jam upstream.

A Provincial flood warning for Chatham was issued at 9:40 a.m.

At mid-day Bradley Farms Limited requested sandbags. These were sent to the Bradleys and to the Dover Township Office by the LTVCA. At this time Dover Township indicated to the LTVCA that they had no flood contingency plan. A flood crest with ice from the Kent Bridge ice jam reached Chatham at 1:00 p.m. At this time the OPP reported minor flooding in Raleigh and Dover Townships affecting county road #34.

In early afternoon, the LTVCA was advised by local residents that water levels were dropping except in the P2-P section of the ARDA dike where some overtopping was occurring. Afternoon observations by local residents indicated that water also was overtopping the township dike and in some places water was spouting through muskrat holes.

According to a local resident, water inside of the ARDA dike began to deepen rapidly at location A by 4:00 p.m.

At 4:25 p.m., the LTVCA surveyed the river by plane from Chatham to the mouth for ice conditions and potential flooding. Water levels were reported high with some overtopping possible in the vicinity of section P2-P of the ARDA dike. At about 5:00 p.m. a flood crest with ice passed through the Prairie Siding Bridge and at the same time the Buchanans were evacuated from their fully flooded property in Tilbury East. Water levels peaked at Chatham at an elevation of 590.2 feet, at 5:30 p.m.

By late afternoon overtopping of the township dike at the junction of the 3rd Concession Road had occurred. The general consensus by local residents is that breaching of the township dike occurred sometime between late afternoon and early evening.

At 6:00 p.m., the LTVCA was advised that water was dropping at the Roy property near the Chatham Yacht Club. A local resident observed that the West Townline Road was covered with water and the water was up to the crown of the 3rd Concession Road. Other observations by local residents included overtopping of the 3rd Concession Road at the Myers Pump by 8:00 p.m. and water across the 3rd Concession and the River Road by 9:00 p.m. However, residents of Bradley Settlement observed that the river was down six inches from the peak during the day.

The 10:00 p.m. newscast on CFCO Radio indicated that the LTVCA expected quite a bit of spillover because of the ice jam, expected the flood peak from Chatham to reach Prairie Siding Bridge by midnight and expected water levels to start receding by morning.

During the late evening, a local resident witnessed water levels rising rapidly in one area adjacent to the ARDA dike (location A). The area immediately behind the ARDA dike where the breach was later to occur (location B) was reported to be saturated. At 10:50 p.m. a resident asked the OPP for assistance to move his wife and sick child (from location C).

2.6 March 9

At 12:30 a.m. the OPP contacted the LTVCA regarding water around a home in Dover West. The MNR was contacted by the LTVCA and the OPP, MNR, and LTVCA met at 1:00 a.m. Attempts by the LTVCA to contact the Dover Township Clerk met with no success. A helicopter, requested by the OPP, arrived at 1:40 a.m. The Dover Township representative on the LTVCA was contacted at 2:00 a.m.

At 2:10 a.m., the OPP observed breaching of a 40 foot section of the ARDA dike (location B).

The OPP evacuated the wife and sick child at 3:30 a.m. by boat.

By 6:00 a.m., severe flooding was reported by the OPP. Local residents indicated that water was over the 3rd Concession Road up to 18 inches in places. By 7:00 a.m., the OPP reported that flood waters had reached a depth of four to five feet.

An early morning flight by staff of the MNR, OPP and the LTVCA indicated that the flooded area extended between dikes on the Thames and Lake St. Clair to the MacFarlane Relief Drain and the Crow Road. Ice remained from the mouth of the Thames two miles upstream to the vicinity of the junction with Jeannettes Creek.

During late morning Bradley Farms Limited cut the dike near their buildings to permit water to flow to the marsh area to the west.

At 11:00 a.m., the LTVCA called a contractor to repair the breach in the ARDA dike.

The gates of the control structure on the MacFarlane Relief Drain were inspected by the Township Engineer at noon. The Engineer noted that the water level downstream of the control gates was within one inch of the level upstream of the gates and that sheet ice was downstream of the gates. Local residents observed that this sheet ice left the downstream section at about 3:00 p.m.

At 1:30 p.m., the LTVCA contacted McQueen Marine regarding the tugboat "Atomic" and was advised of restrictive ice conditions on Lake St. Clair and the necessity for an accompanying coast guard cutter. The LTVCA was advised by the Captain of the Atomic that a coast guard cutter could only come within about eight miles of the mouth of the Thames River.

Air surveillance from 1:30 to 2:00 p.m. indicated that flood waters would spread across the MacFarlane Relief Drain. The LTVCA indicated to CFCO Radio that residents in Concessions three, four, five and six between the West Townline and Jacob Side Road could be flooded and should be prepared to evacuate if necessary.

The LTVCA, the Dover Township Engineer and an MNR representative again surveyed the area by air from 2:30 to 3:30 p.m. The Township Engineer indicated that flood relief could best be obtained by breaching inland dikes adjacent to the MacFarlane Drain at the 3rd Concession Road.

A contractor was on site to repair the ARDA dike by 3:00 p.m.

During the afternoon, the Bradleys breached the ARDA Lake dike in five places. At 4:30 p.m., 37 people were evacuated from the Bradley Settlement.

The 6:00 p.m. CFCO newscast carried reports by the OPP that the areas north to the 9th Concession Road and east to Winterline Road were likely to suffer widespread flooding. By 7:00 p.m., the OPP stated that people in the areas likely to be flooded should be evacuated. From 8:00 p.m. to 9:00 p.m. representatives of the LTVCA, MNR and Dover Township met to review the flood events.

The 9:00 p.m. newscast on CFCO Radio indicated that flood waters were spilling over the MacFarlane Relief Drain. The 11:00 p.m. news indicated reports from the LTVCA, the OPP and Dover Township representatives that the 5th and 6th Concession Roads and the Jacob Side Road could be the extent of open flood waters.

General consensus is that flood depths reached their maximum on Friday evening. Local farmers raised the control gates at the outlet of the MacFarlane Relief Drain between 11:00 and 12:00 p.m. and noted a sudden increase in flow.

2.7 March 10

Early morning flight observations by the LTVCA and Dover Township staff indicated flood levels had stabilized and the maximum extent of flooding had occurred. The ice jam in the vicinity of the junction with Jeannettes Creek was stationary and water levels in the river were dropping. The ice jam slowly started to move by late morning.

2.8 March 11

Breaches of the inland dikes were made at the Myers Pump in the morning. The LTVCA arranged to have ice at the mouth of the Thames River dynamited at 10:30 a.m.

Later in the day the ice jam at the mouth of Jeannettes Creek broke and river levels receded rapidly. The LITVCA, OPP, MNR and Dover and Tilbury East Township representatives met at 1:30 p.m. to review the events and coordinate efforts for remedial works.

2.9 March 12

The OPP reported that no less than 12 breaches in the township dike were undergoing repair. A total of 94 homes, 300 farm buildings and 9725 acres of farm land were estimated to be affected.

3. FLOOD CONTINGENCY PLANNING

3.1 Provincial Policy

The Provincial policy for flood emergency response planning is outlined in the booklet, "Planning for Flood Emergencies" issued by the Minister of Natural Resources in 1976. This policy statement followed an Order-in-Council which designated the MNR as the lead provincial ministry for responding to declared flood emergencies. The policy statement outlined the responsibilities and functions of municipalities, conservation authorities and the ministry before and during the declaration of a flood emergency. It also provides a guide to the preparation of a municipal flood contingency plan.

The fundamental assumption upon which the flood response system is based is that the initial responsibility for reacting to an emergency and protecting the welfare of residents rests with the municipality. The Province will provide direct assistance only when the emergency has escalated beyond the capability of the municipality and a provincial flood emergency has been declared by the Minister.

According to the policy, the municipal flood contingency plan should indicate how municipal resources are to be deployed in a coordinated fashion when an emergency exists or is imminent; the chain of command including the designation of a flood coordinator; and how coordination and liaison will take place with the local conservation authority and the district office of the MNR.

Three key roles for conservation authorities are identified:

- i) maintenance of a flood warning system throughout the authority;
- ii) the stimulation of coordinated contingency planning by and among municipalities within the watershed;
- iii) provision of technical advice to municipalities to prevent or reduce the effect of flooding.

In addition to the above responsibilities, the authority is expected to maintain communications with the MNR and the municipality prior to and during the emergency.

At the provincial level the MNR is responsible for providing a flood warning system to alert conservation authorities and for actually declaring an emergency. At the local level the MNR district office is responsible for preparing a provincial flood contingency plan which describes how provincial resources will be mobilized in the event of a declared emergency. The local ministry flood response coordinator is responsible for liaison with the local conservation authority, for assessing the situation with the authority when an emergency is pending, and for recommending to the provincial coordinator when declaration of a provincial emergency is required.

3.2 Response to Defined Roles During the Dover Flood

3.2.1 Dover Township

Dover Township had no flood contingency plan despite receiving a reminder letter from the Minister of Natural Resources in February, 1979 and having their member on the LITVA personally reminded at the February 23 General Meeting of the Authority. Neither did the Township request provincial assistance through the declaration of a provincial flood emergency. On the other hand, the Township received no warning of the magnitude of the impending flood from either the LITVA or local residents until at least some breaching of the dikes had occurred. It is not possible to determine whether action by the Township could have prevented the flood; however, Tilbury East did act to bolster their dikes without a formal warning and their dikes did not breach.

3.2.2 Lower Thames Valley Conservation Authority

The residents of Dover Township were given no warning of the magnitude of the impending flood. The message closest to a warning was given on the 10:00 p.m. CFCO Radio newscast on March 8. On this newscast, CFCO indicated that the LITVA expected quite a bit of spillover because of a jam at the mouth of the Thames which was restricting flow.

The Committee believes that staff of the LITVA conscientiously monitored ice and flow conditions on March 7 and March 8 and had adequate information to justify issuing a formal flood warning. In the morning of Thursday, March 8 the Authority observed water levels six to eight inches from the top of the dike by St. Peter's Church, sheet ice downstream of the junction with Jeannettes Creek, and an ice jam upstream. It is the opinion of the Committee that the LITVA should have immediately issued a flood warning based on these observations, the knowledge that the peak flow would arrive from upstream later in the day, and the fact that the Vice-Chairman, in charge of the Authority at the time, had obviously perceived the danger and had taken preventative action on the dikes in his Township, Tilbury East. The Committee also is of the opinion that a flood warning was not given by the LITVA staff at that time because of their inexperience in interpreting observations of ice conditions.

Another role defined for conservation authorities in the Provincial flood emergency response policy is to stimulate and encourage preparation of flood emergency response plans. The LITVCA wrote to Dover Township regarding flood response planning on two different occasions over the past two to three years and repeated the need for preparedness at the February 23 General Meeting which the Dover member on the Authority attended. While this might be interpreted as sufficient "stimulation and encouragement", the Committee is of the opinion that greater effort was warranted in the case of a flood susceptible municipality such as Dover Township.

The LITVCA has its own flood contingency plan which states the role the Authority will play in a flood emergency. This role includes undertaking emergency measures to alleviate flood damages that are beyond the means of a single municipality, such use of ice breakers, dynamite and aircraft. The plan was forwarded to all municipalities in the Watershed in January, 1977.

3.2.3 The Ministry of Natural Resources

The peak flood forecast made for Chatham by the Provincial Streamflow Forecast Centre was reasonably accurate in terms of volume and expected time of arrival. This forecast was based on expected stream responses to snowmelt and/or rainfall in the Upper Thames Valley Watershed and did not take ice conditions in the lower reaches of the River into account in any quantifiable way. Neither the historical data, technology or staff resources are available at this time to make such predictions possible.

The MNR District Office in Chatham received no request from either Dover Township or the LITVCA to have a flood emergency declared by the Province and therefore was not formally involved. However, the District Manager indicated to the Reeve of Dover Township that such aid was available. Also, the Chatham District Office kept in close contact with the LITVCA and the OPP throughout the flood period.

3.2.4 The Ontario Provincial Police

The Committee also considered the actions of the OPP and is in agreement with local residents and agencies who complimented the OPP on their quick response in providing security, surveillance and means of evacuation.

3.3 General Response to Flood Contingency Planning

Before making specific recommendations regarding the flood emergency response system, based only on the Dover Township experience, the Committee reviewed the system with the Provincial Coordinator and other senior MNR officials in both Toronto and London. Also it was reviewed with the City Engineer for Chatham and staff of

the Upper Thames Valley Conservation Authority. From these interviews it was noted that there has been a variable response in the preparation of flood contingency plans by municipalities.

Conservation authorities differ in the degree in which they stimulate production of municipal contingency plans. In some cases, conservation authorities have been delegated a greater response role by their member municipalities than described for them in the provincial policy.

Most large cities and regional municipalities have developed flood contingency plans, as have smaller towns and villages which face flooding on a regular basis. It is difficult to determine how many rural townships have produced plans; probably most have not. There is a general agreement that the primary response role should remain with the municipality, but that the MNR and conservation authorities must become involved in the response process before the flood has actually occurred.

3.4 Conclusions and Recommendations Concerning the Flood Contingency Policy

The Committee concludes that the present policy for flood emergency response planning is basically sound and that the roles assigned by it to the MNR, conservation authorities and municipalities are proper. However, there are a number of specific modifications which could be made and supporting measures which could be added to improve it.

The flood emergency response system will only work if all three agencies know their own roles and the roles to be played by the companion agencies. This requires that flood contingency plans are prepared and updated annually. While it is recognized that it is more difficult for a rural municipality with limited staff resources to prepare a plan, the Committee believes that plans must be prepared. Such plans could be prepared for Council's approval by the township engineer, roads commissioner or, perhaps, the drainage superintendent. Preparation of flood contingency plans could be facilitated if model plans were available from the MNR. The Committee recommends that

THE MINISTRY OF NATURAL RESOURCES PREPARE MODEL FLOOD
CONTINGENCY PLANS APPROPRIATE FOR RURAL TOWNSHIPS. (1)

The Committee recognizes that staff and political changes in both conservation authorities and municipalities can result in a lack of familiarity with plans which may be already in place. Accordingly, the Committee recommends that

THE FLOOD RESPONSE COORDINATORS OF CONSERVATION
AUTHORITIES, MUNICIPALITIES AND THE DISTRICT OFFICE
OF THE MINISTRY OF NATURAL RESOURCES MEET ANNUALLY
TO ENSURE THAT ALL FLOOD CONTINGENCY PLANS ARE UP-
TO-DATE AND COORDINATED. THIS FLOOD COMMITTEE WOULD
MEET ANY TIME A FLOOD EMERGENCY WAS EXPECTED AND WOULD
REMAIN IN CONTACT THROUGHOUT THE EMERGENCY. (2)

The Committee concludes that conservation authorities should "actively promote" rather than merely "encourage and stimulate" the preparation of flood contingency plans by a municipality. The Committee recommends that

IN THOSE CASES WHERE A MUNICIPALITY HAS NOT PREPARED A FLOOD RESPONSE PLAN, STAFF OF THE CONSERVATION AUTHORITY SHOULD DIRECTLY CONTACT STAFF OF THE MUNICIPALITY INDICATING THE IMPORTANCE OF PREPARING SUCH A PLAN AND VOLUNTEERING TO ASSIST IN ITS PREPARATION. IF NECESSARY, THE CHAIRMAN OF THE CONSERVATION AUTHORITY SHOULD DIRECTLY CONTACT THE HEAD OF COUNCIL AND DO LIKEWISE. (3)

Even if recommendation 3 is followed, some municipalities still may not prepare a flood contingency plan and there is no statutory authority requiring them to do so. One means short of a statutory requirement would be to adopt a provincial policy by which only municipalities having a flood emergency plan would be eligible for provincial flood disaster relief. However, even this mechanism would not deal with the problem where a lack of a plan by one municipality could ultimately result in increased flood damages to a neighbouring municipality. Such a situation could occur in areas with a complex system of dikes, like the case of the Lower Thames Valley. The Committee recommends that

THE CONSERVATION AUTHORITIES ACT AND THE MUNICIPAL ACT BE AMENDED TO PERMIT THE PREPARATION OF A FLOOD CONTINGENCY PLAN FOR A MUNICIPALITY BY A CONSERVATION AUTHORITY HAVING JURISDICTION IN CASES WHERE A MUNICIPALITY HAS CONSISTENTLY NEGLECTED PREPARING A PLAN AND WHERE SUCH A SITUATION COULD SUBSTANTIALLY INCREASE THE CHANCES OF FLOOD DAMAGE TO THAT AND/OR A NEIGHBOURING MUNICIPALITY. (4)

Subject to the approval of the Ministers of Natural Resources and Intergovernmental Affairs the conservation authority would be authorized to charge back all costs of preparing a plan to the municipality.

The Committee has noted that floods resulting from ice jams have occurred elsewhere in Southern Ontario this year and that there is a general lack of experience and expertise among those responsible for dealing with the problem. The Committee understands that there are experts in ice management whose knowledge could and should be utilized. The Committee therefore recommends that

THE MINISTRY OF NATURAL RESOURCES SHOULD ASSEMBLE EXPERTS AND STAGE A SEMINAR DEALING WITH ICE MANAGEMENT AND ITS RELATIONSHIP TO FLOODING. (5)

Such a seminar should be particularly directed at staff of conservation authorities, municipalities, and field staff of the MNR.

The Committee understands that a person making a decision to remove an ice jam either through dynamiting or through the use of an ice breaker may be held liable for damages that may result. Such a situation discourages individuals from taking action, even when such action may well be warranted. The Committee notes that Section 71-2 of The Ontario Water Resources Act removes liability of a

public servant making a decision under that Act. The Committee recommends that

THE MINISTRY OF NATURAL RESOURCES AND THE MINISTRY OF THE ATTORNEY GENERAL INVESTIGATE THE POSSIBILITY OF REMOVING PERSONAL LIABILITY FOR PUBLIC SERVANTS MAKING DECISIONS TO PREVENT OR REMOVE ICE JAMS WHERE A FLOOD THREAT EXISTS. (6)

The Committee also considered whether or not the MNR should become involved earlier in the response to a pending flood emergency and, for example, be authorized to spend funds up to a certain limit without a provincial flood emergency being declared. The Committee rejected this possible amendment because it believes that if proper communication takes place as the flood emergency builds, then a quick provincial response is possible since the local MNR flood response coordinator has the information necessary for making an immediate decision. Also, such an amendment would violate the basic principle that the municipality has primary responsibility for protecting its residents.

4. QUESTIONS AND ANSWERS

Throughout its review of events with individual residents, media reports and during its public meeting at Pain Court the Committee has noted a number of questions and allegations which it believes deserve a response.

4.1 Why Didn't the LTVCA Bring in the "Atomic" to Break Up the Ice?

The LTVCA stated to the Committee that the tug "Atomic" was not called prior to March 8, 1979 because ice conditions did not indicate that any unusual or extreme ice jamming would occur.

When the LTVCA contacted the Captain of the "Atomic" on March 9 at approximately 1:30 p.m. the Captain indicated that he would have difficulty in reaching the mouth of the Thames because ice in Lake St. Clair was up to three feet in thickness, the "Atomic" would need the assistance of a coast guard cutter and a coast guard cutter could only provide assistance to within approximately eight miles of the mouth. The Captain also stated his concern over the depth of the channel above the sandbar at the mouth of the Thames.

In assessing the situation, the LTVCA noted that in 1965 the "Atomic" had trouble navigating one foot of ice in the lake and took approximately two and one-half days to arrive with the assistance of a coast guard cutter and that an ice jam at the mouth had caused flooding to 25,000 acres. Also, the Canadian coast guard cutter was not in the vicinity. Because there was doubt that the tug could reach the mouth in time to be effective and because of the concern that removal of the ice jam at Jeannettes Creek could create another jam at the mouth, the LTVCA decided not to bring in the "Atomic".

4.2 Why Didn't the LTVCA Blast the Ice Earlier?

The LTVCA informed the Committee that it did not dynamite ice at the mouth of the Thames before the flooding occurred because a

good flow and open water was observed at the mouth of the river on both March 7 and 8 and it was felt that with the velocity observed, the mouth would open up satisfactorily on its own. Dynamiting was not seen as an effective means of solving the problem of the sandbar at the mouth. Other considerations behind the decision included the need to provide a very large space in the lake to effectively handle ice from upstream and the concern that the ice would re-freeze after the dynamiting.

The ice jam in the river upstream from Jeannettes Creek was not dynamited because the LTVCA status report of March 8 indicated dropping water levels and LTVCA had received no reports of ice problems from the townships. Concern existed that if the ice was moved to the mouth of the Thames, jamming there, complicated by the existence of the sandbar, could cause flooding in four townships thereby increasing the liability associated with making such a decision. Also, there would have been problems in locating a firm willing to risk moving onto the ice jam to dynamite.

4.3 Why Wasn't the ARDA Diking Scheme Completed?

4.4 Why Were the Dikes on the Dover Side Lower Than on the Tilbury East Side?

4.5 Who is Responsible for Maintaining the Dikes?

The ARDA¹ diking scheme was part of a Federal/Provincial Agreement signed in 1974. This agreement was administered by a joint Federal-Provincial Steering Committee. A local steering committee consisting of the Lower Thames Valley, the Essex and St. Clair Conservation Authorities with the assistance of a consulting engineer recommended priorities for staging construction of dikes. Three categories of priorities were defined and a recommendation was made that projects classed within the first two categories of priority be completed before projects within the third priority category were undertaken. The township dike, section P2-G and a section of dikes on the Buchanan property abutting the Thames River were all designated as priority 3. The Joint Federal-Provincial Steering Committee specifically recommended that the dike abutting the Buchanan property be given a low priority rating because of the relationship of costs relative to the value of the land to be protected. Also, Buchanan Brothers did not wish to assume the 10 percent of costs they would have been assessed. Similarly, the township dike and the Bradley dikes were not reconstructed when Bradley Farms Ltd. indicated that it did not wish to assume the 10 percent of costs that it would have been assessed. Section P2-G was not constructed when it was found to have a benefit-cost ratio of less than one.

1 Strictly speaking the diking program was not undertaken under an Agricultural and Rural Development Agreement (ARDA), but rather under a special Federal-Provincial Agreement signed by the Ministers of Environment and Agriculture on behalf of Canada and by the Minister of Agriculture and Food, on behalf of Ontario. The dikes are known locally as "ARDA" dikes and the Committee has adopted this local designation.

The Federal Government decided in February, 1978 that it would cease funding the construction of diking projects in Southwestern Ontario as of March 31, 1979. Also, federal contributions for the fiscal year 1978-1979 were limited to \$2 million. As a result, a number of dikes proposed in the original scheme were not completed.

Local residents have observed that the ARDA dike on the Dover Township side where the breach occurred is approximately two feet lower than the elevation of the corresponding ARDA dike on the Tilbury East side. The Committee has verified this observation by taking its own site elevations and examining the "as constructed" design specifications for the two sets of dikes. The reason for the different elevations, according to the consulting engineer, is that the ARDA dikes were designed to an elevation which would accommodate a maximum flow of 40,000 cfs. In some cases dikes existing in Tilbury East prior to the ARDA reconstruction were higher than the minimum elevation required. These dikes were not lowered. The Committee also has been told that in some locations the ARDA dikes provide a higher level of protection to Dover Township than to Tilbury East Township.

There are varying responsibilities for maintaining dikes in Dover Township. The LTVCA has maintenance responsibilities for dikes reconstructed under the Federal-Provincial Agreement. The LTVCA is in the process of negotiating maintenance arrangements with Dover Township and landowners on whose property the dikes are situated. The Township dike is part of the Thames River embankment originally constructed under The Drainage Act. The Township is therefore responsible for maintenance. Maintenance responsibility for the private dikes immediately in front of the Bradley Settlement belongs to Bradley Farms Limited.

4.6 Was a "Wall of Water" Released from Fanshawe Reservoir?

The Committee analyzed a number of stream flow and dam operation records from the Upper Thames Valley Conservation Authority for the period from March 4 to March 7. Given the approximate three and one-half day travel time of a flood crest from Fanshawe Dam to Chatham, such records would indicate whether or not a "wall of water" was released. The Committee found that the operation of Fanshawe Dam reduced the peak flow from the north branch of the Thames River from 12,600 to 8,000 cfs and maintained a regulated outflow of 8,000 cfs until early on March 7 at which time outflows were permitted to return to natural rates. The peak flow from the south branch of the Thames reached a maximum of about 15,000 cfs.

The Committee acknowledges that there was a rapid rise in water levels in Dover Township but concludes that it was due to the ice jam, not a sudden release of water from the Fanshawe Reservoir.

Another allegation is that Fanshawe Dam was operated with only the interests of London in mind. The Committee rejects this allegation. Bearing in mind the rapid increase in flow that was occurring in the north branch of the Thames on March 5 and the presence of fairly heavy rainfall in the vicinity, the Upper Thames Valley Conservation Authority would have released up to about 12,000 cfs if only the interests of London were being taken into account.

4.7 Why Weren't the Control Gates on the MacFarlane Relief Drain Opened Earlier?

When the township engineer first visited the control gates at noon, March 10, the water level downstream of the gates was measured to be only one inch lower than upstream of the gates and water was passing freely through the by-pass channel. It was concluded by the engineer that raising the gates at that time would not significantly contribute to increasing the volume of downstream flow.

While the engineer may have made a technically correct decision at the time of his observations, the Committee is of the opinion that raising the control gates would have done no harm and could have been beneficial later in the afternoon.

4.8 Why Wasn't the Prairie Siding Gauge Operating?

According to the LTVCA, mechanical difficulties with the telephone hook-up meant the gauge could not be calibrated and therefore could not give accurate readings.

In this case, the Committee concludes that readings from the gauge would have been of little help.

4.9 Did Selfridge Airforce Base Offer to Dynamite the River?

The LTVCA stated that it was not offered any assistance in the dynamiting of ice.

5. REDUCING THE CHANCES OF ANOTHER
FLOOD DISASTER IN DOVER TOWNSHIP

5.1 Ice Management

The Dover Township Flood of March, 1979 occurred because thick ice remained in the lower reaches of the Thames River and in Lake St. Clair when the spring freshet arrived from upstream. As a result, ice chunks from upstream and the ice breaking off at the upstream extremity of the ice sheet combined to create a massive ice dam. This ice dam restricted downstream flows resulting in overtopping and the eventual breaching of dikes.

Problems of ice jamming on the Thames downstream of Chatham were considered in the 1967 report of the Lower Thames River¹ by James F. MacLaren Ltd. This report included recommendations regarding removal of the sandbar at the mouth of the Thames, the use of an ice breaker, use of dynamite and the monitoring and recording of ice and break-up characteristics. The Committee believes these recommendations should be re-examined, taking into account inflation and the additional protection now provided by the ARDA Diking Program. The Committee recommends that

¹ Report on the Lower Thames River Channel and Dike System from Chatham to Lake St. Clair. 1967. James F. MacLaren Ltd., London.

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY,
ONTARIO AND CANADA FURTHER INVESTIGATE THE FEASIBILITY
OF AND JURISDICTIONAL RESPONSIBILITY FOR PROVIDING FOR (7)
ALTERNATIVE MEANS OF KEEPING THE CHANNEL AT THE MOUTH
OF THE THAMES RIVER OPEN.

The Committee noted that ice jamming at the mouths of Jeannettes
and Baptiste Creeks also occurs frequently and that local residents
indicate that bars may exist there also. The Committee recommends
that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY
INVESTIGATE THE EXISTENCE OF BARS AT THE MOUTHS OF
JEANNETTES AND BAPTISTE CREEKS AND, IF APPROPRIATE, (8)
DETERMINE THE FEASIBILITY OF REMOVING THEM.

In regards to the use of an ice breaker, the Committee recommends
that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY
DETERMINE THE COST-EFFECTIVENESS OF HIRING, BUILDING
OR OTHERWISE PROCURING AN ICE BREAKER(S) CAPABLE OF (9)
DEALING WITH THE VARIOUS ICE CONDITIONS LIKELY TO
OCCUR AT THE MOUTH OF THE THAMES RIVER AND UPSTREAM
TO CHATHAM.

The present Prairie Siding Bridge has been the location of several
ice jams in the past and could act as a barrier to the upstream
passage of boats. The Committee recommends that

WHEN THE PRAIRIE SIDING BRIDGE IS RECONSTRUCTED IT
BE DESIGNED TO PERMIT UPSTREAM PASSAGE OF ICE BREAKERS (10)
AND TO MINIMIZE THE PROBABILITY OF ICE JAMMING.

The Committee noted that dynamiting was recommended in the 1967
Report on the Lower Thames, that dynamiting has been used success-
fully in other similar circumstances and has been used historically
on the Thames. The Committee also was impressed by the evidence of
a dynamiting expert who believed that it could be used as a
preventative measure, given adequate lead time. The Committee
recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY DETERMINE
THE COST-EFFECTIVENESS OF USING DYNAMITE TO REMOVE AND/ (11)
OR TO ASSIST IN THE REMOVAL OF SHEET ICE OF VARIOUS
THICKNESSES AT BOTH THE MOUTH OF THE THAMES AND UPSTREAM.

The Committee has concluded from the 1967 Lower Thames River Report
and from discussions with staff of the Provincial Streamflow Fore-
cast Centre that records of ice thickness and break-up character-
istics under different flow and temperature regimes must be main-
tained. Without them, predictions of flows which take the effect
of ice into account or accurate decisions about the cost-effective-
ness of alternative means of preventing ice jams cannot be made.
The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY UNDERTAKE
A MORE COMPREHENSIVE ICE THICKNESS MONITORING PROGRAM (12)

FOR THE REACH OF THE THAMES RIVER DOWNSTREAM OF CHATHAM; SYSTEMATICALLY RECORD THE CHARACTERISTICS OF BREAK-UP AND ICE JAMMING AND SYSTEMATICALLY RECORD THE EFFECTIVENESS OF VARIOUS PREVENTIVE MEASURES SUCH AS THE USE OF ICE BREAKERS OR DYNAMITE.

Based on the results of recommendations 7 to 12 and any subsequent decisions about the raising of dikes, the Committee strongly recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY PREPARE A COMPREHENSIVE ICE MANAGEMENT PLAN FOR THE THAMES RIVER. THIS PLAN SHOULD SPECIFY, ACCORDING TO CRITERIA, WHICH PREVENTIVE AND/OR REMEDIAL MEASURES WOULD BE USED UNDER VARIOUS CONDITIONS OF ICE THICKNESS, SNOWMELT, RAINFALL, EXPECTED PEAK FLOW FROM UPSTREAM AND WATER LEVELS IN LAKE ST. CLAIR. (13)

Ice management is a specialized type of knowledge which the Committee concludes the LTVCA staff must possess. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY ENSURE THAT STAFF RECEIVE SPECIALIZED TRAINING IN ICE MANAGEMENT AND THAT SUCH STAFF FAMILIARIZE THEMSELVES WITH THE EXPERIENCE OF OTHER AGENCIES WHICH HAVE DEALT WITH THE PROBLEMS OF ICE JAMMING. (14)

The Committee notes that flow regulation can be an aid to ice management and recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY REGULARLY INFORM THE UPPER THAMES VALLEY CONSERVATION AUTHORITY OF ICE CONDITIONS IN THE LOWER REACHES OF THE THAMES RIVER IN ORDER THAT THE UPPER THAMES VALLEY CONSERVATION AUTHORITY CAN TAKE SUCH CONDITIONS INTO ACCOUNT IN THE OPERATION OF DAMS. (15)

5.2 Dikes

The major breaching of dikes in Dover Township emphasizes that a diking system is only as good as its weakest link. It also indicates that the marginal benefits from the additional protection resulting from the ARDA reconstruction can only be realized if the remaining dikes are brought up to that design standard. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY, ONTARIO AND CANADA RE-EXAMINE THE FEASIBILITY OF COMPLETING THE ARDA DIKING SYSTEM UP TO THE DESIGN STANDARD OF THE EXISTING ARDA DIKES. (16)

The dikes along the Thames River probably received severe stress during the March flood. The Committee recommends that

ALL AGENCIES AND INDIVIDUALS IMMEDIATELY INSPECT THEIR RESPECTIVE DIKES TO ENSURE THAT SUCH DIKES HAVE NOT BEEN PERMANENTLY WEAKENED. (17)

It is important to ensure that dikes are well maintained since tree roots, muskrat holes, groundhog holes or erosion can lead to weakening of dikes and substantially increase the chances of failure. Also, it must be stressed that all dikes in the system must be maintained to retain the integrity of the system. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY, IN COOPERATION WITH DOVER TOWNSHIP AND LOCAL LANDOWNERS ENSURE THAT A MAINTENANCE PROGRAM FOR ALL DIKES IN DOVER TOWNSHIP ABUTTING EITHER LAKE ST. CLAIR OR THE THAMES RIVER IS DEVELOPED AND IMPLEMENTED. (18)

Such a program would include an Autumn inspection of all dikes.

The Committee is concerned that a structural failure occurred in the very recently reconstructed ARDA dike. According to some local residents, soil underlying the ARDA dike in the vicinity of where the breach occurred is sandy. Also, the breaching of dikes in this location prior to the ARDA reconstruction has occurred at least twice. This suggests that section P2-P of the ARDA dike needs special attention. The Committee recommends that

DETAILED ENGINEERING STUDIES BE UNDERTAKEN FOR THE SECTION OF THE ARDA DIKE KNOWN AS P2-P IN ORDER TO DETERMINE IF THE TEXTURE OF THE UNDERLYING MATERIALS MAKES FURTHER BREACHING OF THE DIKE LIKELY AND IF RECONSTRUCTION OR STRENGTHENING IS NECESSARY. (19)

5.3 Flood Contingency Planning

The Committee recommends that

DOVER TOWNSHIP IMMEDIATELY DEVELOP A FLOOD CONTINGENCY PLAN, NAME A FLOOD COORDINATOR AND PROVIDE THIS PERSON WITH DELEGATED AUTHORITY TO SPEND UP TO A SPECIFIED AMOUNT OF FUNDS IN THE EVENT OF A FLOOD THREAT. (20)

The Committee is of the opinion that the ARDA lake dikes trapped considerable water and added to the depth of the flood. Unless proper action is taken immediately upon breaching or overtopping, the complex system of dikes in Dover Township may actually worsen flooding once flood waters enter into a diked area. The Committee recommends that

THE FLOOD CONTINGENCY PLANS OF BOTH THE LOWER THAMES VALLEY CONSERVATION AUTHORITY AND DOVER TOWNSHIP SPECIFY WHO HAS AUTHORITY TO BREACH THE DIKES, UNDER WHICH CONDITIONS VARIOUS BREACHES IN DIKES ARE AUTHORIZED, AND WHERE SUCH BREACHES ARE TO BE MADE. (21)

Because of the common flood threat which exists, the external effects which might result because of dikes and the possibly conflicting interests among municipalities in the way with which ice problems are dealt, the Committee recommends that

A FLOOD CONTINGENCY COMMITTEE CONSISTING OF FLOOD COORDINATORS OF THE CITY OF CHATHAM, RALEIGH, DOVER, NORTH AND EAST TILBURY TOWNSHIPS, THE MINISTRY OF NATURAL RESOURCES AND THE ONTARIO PROVINCIAL POLICE BE SET UP UNDER THE CHAIRMANSHIP OF THE FLOOD COORDINATOR OF THE LOWER THAMES VALLEY CONSERVATION AUTHORITY. (22)

This Committee would meet each January to review the plans of all agencies to ensure that no gaps or conflicts exist and to develop agreements for mutual assistance. The flood contingency committee would meet whenever a flood threat occurred in order to ensure a coordinated response could be quickly implemented. In the case of a flood emergency situation, the flood coordinator of the LTVCA would be responsible for the overall coordination of actions by the municipalities.

The Committee is concerned that the overtopping of dikes which was observed in several locations by the local residents on Thursday, March 8th was not communicated to either the LTVCA or Dover Township. If the extent of this overtopping had been known, a flood warning probably would have been given by the LTVCA and residents would have had the opportunity to remove some of their belongings before the breaching occurred. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY, IN COOPERATION WITH DOVER TOWNSHIP AND LOCAL RESIDENTS DEVELOP A SYSTEM OF DIKE WATCHERS WHO WOULD SYSTEM-ATICALLY MONITOR AND REPORT WATER LEVELS IN STRATEGIC LOCATIONS ONCE A CRITICAL WATER LEVEL WAS REACHED. (23)

As a preventive measure, Dover Township has a building by-law which restricts openings in residential buildings to a minimum elevation. The by-law is intended to reduce damage to residences in the event of a flood. The Committee supports this by-law but notes that a much greater number of flood damage reduction techniques are available. The Committee recommends that

DOVER TOWNSHIP, IN COOPERATION WITH THE LOWER THAMES VALLEY CONSERVATION AUTHORITY REVIEW AVAILABLE FLOOD DAMAGE REDUCTION TECHNIQUES WITH THE OBJECTIVE OF INCORPORATING A FULLER RANGE OF THESE TECHNIQUES IN THE BUILDING BY-LAWS OF DOVER TOWNSHIP.

5.4 Information and Communications

The Committee believes that an increased flow of information among local residents, Dover Township and the LTVCA is essential to the successful development and implementation of a flood contingency plan in Dover Township. The Committee is particularly concerned that local residents take an interest in the dikes, understand that the dikes can fail, and not become complacent when flooding has not occurred for a number of years. Water at elevations higher than the ARDA dikes can be expected in the future and residents must be prepared for such an eventuality. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY DEVELOP AN EDUCATIONAL PROGRAM FOR RESIDENTS OF DOVER TOWNSHIP INDICATING THE LEVEL OF PROTECTION PROVIDED BY THE DIKES, RESPONSIBILITY FOR MAINTENANCE OF THE DIKES AND THE NECESSITY OF CAREFULLY MONITORING DIKES AND TAKING APPROPRIATE ACTION IN THE EVENT OF A LIKELY OVERTOPPING OR BREACHING. (25)

The Committee also recommends that

DOVER TOWNSHIP INVOLVE THEIR RESIDENTS IN THE PREPARATION OF THE DOVER TOWNSHIP FLOOD CONTINGENCY PLAN AND MAKE COPIES OF THIS PLAN READILY AVAILABLE TO ALL RESIDENTS OF THE TOWNSHIP. EACH YEAR, RESIDENTS IMMEDIATELY ADJACENT TO THE DIKES SHOULD BE REMINDED OF THE POTENTIAL FLOODING AND HOW THEY SHOULD RESPOND IN SUCH AN EMERGENCY. (26)

The local media could play a useful role in both the preparation and the implementation of flood emergency response plans. The Committee recommends that

THE LOCAL MEDIA BE INVITED TO PARTICIPATE IN THE DEVELOPMENT AND ANNUAL REVIEW OF THE FLOOD CONTINGENCY PLANS OF DOVER TOWNSHIP AND THE LOWER THAMES VALLEY CONSERVATION AUTHORITY. (27)

In the event of a flood emergency, it is necessary to ensure that information is quickly and accurately transmitted, not only among the agencies having direct responsibilities but also to the media and the general public. The Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY DESIGNATE A PERSON TO PROVIDE ALL FLOOD BULLETINS AND WARNINGS TO THE MEDIA, TO UPDATE THEM AS NECESSARY AND TO SPECIFY WHEN THEY NO LONGER APPLY. (28)

To minimize possible misinterpretation the Committee recommends that

THE MEDIA COMMUNICATE FLOOD BULLETINS AND WARNINGS TO THE PUBLIC EXACTLY AS ISSUED BY THE LOWER THAMES VALLEY CONSERVATION AUTHORITY. (29)

The communications capacity of the LTVCA needs to be expanded to accommodate a number of the recommendations made above. More specifically the Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY HAVE INSTALLED A PRIVATE TELEPHONE LINE WITH AN UNLISTED NUMBER FOR THE SOLE USE OF INDIVIDUALS NAMED IN THE FLOOD CONTINGENCY PLANS OF THE VARIOUS AGENCIES, THE DIKE WATCHERS AND THE LOCAL MEDIA. (30)

Also, the Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY INVESTIGATE THE FEASIBILITY OF DEVELOPING A SYSTEM OF DIRECT RADIO CONTACT WITH THE ONTARIO PROVINCIAL POLICE. (31)

To provide up-to-date information to the general public, the Committee recommends that

THE LOWER THAMES VALLEY CONSERVATION AUTHORITY MAKE
WARNINGS AVAILABLE THROUGH DESIGNATED TELEPHONE
NUMBERS OF THE AUTHORITY.

(32)

APPENDIX A

Individuals and Agencies Providing
Information to the Committee

Lower Thames Valley Conservation Authority

Mr. C. M. Wilson	- Chairman
Mr. B. Rammelaere	- Vice-Chairman
Mr. T. Campbell	- Member
Mr. J. Campbell	- Secretary-Treasurer
Mr. B. Bennett	- Resources Planner

Dover Township

Mrs. R. Burke	- Reeve
Mr. R. Crawford	- Deputy Reeve
Mr. R. Anderson	- Councillor
Mr. R. Goodwin	- Councillor
Mr. L. Jubenville	- Councillor
Mr. D. Perdu	- Township Clerk
Mr. D. McGeorge	- Township Engineer

Local Residents

Mr. C. Bradley
Mr. D. Bradley
Mrs. M. Bradley
Mr. R. Bradley
Mr. R. Bradley Jr.
Mr. D. Buchanan
Mr. W. Buchanan
Mrs. L. Cooke
Mr. A. Debaere
Mr. F. Jarvis
Mr. J. Johnston
Mr. M. Johnston
Mrs. B.A. Jubenville
Mr. M. Jubenville
Mr. T. Jubenville
Mr. J. Levens
Mr. W. Levens
Mr. V. Marchand
Mr. E. Parr
Mr. R. Pinsonneault
Mrs. D. Reaume
Mr. W. Reaume
Mr. W. Roy
Mr. J. Smit
Mr. B. Smith
Mr. O. Tetrault

About 100 local residents attending the April 4 public meeting at Pain Court

Ontario Provincial Police - Chatham

S/Sgt. R. Webster
D/Sgt. G. Wilson
Cons. J. Melnick

CFCO Radio - Chatham

Mr. D. Thomas - Manager
Mr. M. LaPointe - News Director

MNR District Office - Chatham

Mr. R. Fortner - District Manager and Local Response Coordinator
Mr. Wayne Rowe - Lands Supervisor
Mr. D. MacLennan - Supervisor of Lake St. Clair Fisheries Assessment Unit

Southwestern Ontario Regional Office - London

Mr. N. Patrick - Regional Director
Mr. P. Crook - Regional Engineer
Mr. R. Hunter - Regional Conservation Authorities Program Supervisor

MNR - Main Office, Toronto

Mr. J. W. Keenan - Provincial Flood Response Coordinator and Executive
Co-ordinator, Lands and Waters
Mr. B. Panting - Alternate Provincial Flood Response Coordinator and
Director of Engineering Services
Mr. R. Weir - Special Services Engineer
Mr. R. J. Bugar - Director, Conservation Authorities
Mr. D. Wood - Assistant Director (Policy Development), Conservation
Authorities
Mr. J. Anderson - Assistant Director (Programming), Conservation
Authorities
Mr. W. Thompson - Provincial Hydrometeorologist
Mr. D. Hailey - Streamflow Forecaster
Mr. M. Conetta - Streamflow Forecaster

Upper Thames Valley Conservation Authority

Mr. R. Powell - General Manager
Mr. R. Anderson - Supervisor of Water Management

Other

Captain Bennett - Canadian Coast Guard, Amherstburg
Mr. H. Crown - Chairman, Canada-Ontario Steering Committee for
Federal/Provincial Diking Agreement
Mr. C. Degarie - Engineer, James F. MacLaren Limited
Mr. Derek Foulds - Director, Inland Waters Directorate (Ontario),
Environment Canada
Captain L. Gillard - Retired Captain of the Atomic
Mr. W. Knowles - Engineer, James F. MacLaren Limited
Mr. N. Leach - Leach Explosives Ltd.
Mr. E. Manchul - Director General, (Ontario) Public Works Canada
Mr. H. Thomas - City Engineer, Chatham
Mr. W. Slychuck - Engineer-in-Charge, Marine and Civil Engineering,
(Ontario) Public Works Canada

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